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ABSTRACT

The Provincial Assessment of Mathematics was conducted at grades 3, 6, 9 and 12. There are three major components to the assessment: (1) a written test of the curriculum objectives carried out in May, 1987 for grades 3, 6, and 9, and in June, 1987 for grade 12 (Mathematics 300 and Mathematics 301); (2) a survey of teachers at these grade levels; and (3) a 1981-86 comparison testing for grades 3, 6, 9, and 12 (General and Mathematics 300) conducted in June 1986. The purpose of this preliminary report is to provide detailed information on the first component for use by classroom teachers in the review of the results in their classrooms. The report contains results of the provincial testing for all test areas (subtests) and for individual items. In the case of tests for grades 9 and 12 where curricular options are available, data reported for these options are not necessarily representative of the province and care should be exercised in interpretation. Subtest data only has been provided for these options. (Author)

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MATHEMATICS ASSESSMENT PROGRAM 1987

PRELIMINARY REPORT

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Manitoba
Education
Curriculum
Development and
Implementation

MANITOBA MATHEMATICS ASSESSMENT PROGRAM 1987

PRELIMINARY REPORT:
TEST DATA

A REPORT OF THE ASSESSMENT SECTION OF THE
CURRICULUM DEVELOPMENT AND IMPLEMENTATION BRANCH
MANITOBA EDUCATION
PROVINCE OF MANITOBA

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PREFACE

The Provincial Assessment of Mathematics was conducted at grades 3, 6, 9, and 12. There are three major components to the assessment: 1) a written test of the curriculum objectives carried out in May, 1987 for grades 3, 6, 9, and in June, 1987 for grade 12 (Mathematics 300 and Mathematics 301); 2) a survey of teachers at these grade levels; and 3) a 1981-86 comparison testing for grades 3, 6, 9, and 12 (General and Mathematics 300) conducted in June, 1986.

In each case a sample of students or teachers was used. This Preliminary Report contains a summary of student performance data based on component (1). The Final Report will contain results from all three components as well as conclusions and recommendations based on the data and its interpretation. This report will be followed by a Summary Report containing basic recommendations for educators of mathematics. Information in these reports is based on the English Language and French Immersion mathematics programs. A companion study has been conducted for the grades 3, 6, and 9 Français Mathematics programs. Separate but similar reports are being developed for this study.

The purpose of this Preliminary Report is to provide detailed information on the first component for use by classroom teachers in the review of the results in their classrooms. The Report contains results of the provincial testing for all test areas (subtests) and for individual items. In the case of tests at the grades 9 and 12 levels, where curricular options are available, data reported for these options are not necessarily representative of the province and care should be exercised in interpretation. Subtest data only has been provided for these options.

It is necessary to refer to the student test booklets and to the scoring manuals when using any results reported here. Schools and divisions in Manitoba have received copies of the testing materials. If you require a copy of any tests and manuals, please contact us at:

Assessment Section
Curriculum Development & Implementation Branch
Manitoba Education
223-1200 Portage Avenue
Winnipeg, MB
R3G 0T5

Test copies and scoring manuals may be purchased from the Manitoba Text Book Bureau.

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CHAPTER 1

INTRODUCTION

The subtests delineated for the Mathematics Assessment at each grade level are reflective of the Manitoba curriculum. In component one, the items represent several levels of the cognitive domain. (See Preface for a discussion on the three components of this mathematics assessment.) All items, except some of those in the grade 3 test, were in a multiple choice format and were awarded one mark for a correct response. The grade 3 items were a mixture of multiple choice and completion or short answer format. The proportions of students selecting the response options for each item are reported. These responses indicate not only the proportion of students getting a particular item correct, but also suggest kinds of errors students may be making.

The provincial results for the four grade levels (5 tests) are presented in Chapters 2 through 5.

Percent of Students Choosing Each Response

The proportion of students in the provincial sample choosing each of the response options (A, B. C, D, or E) for each item is presented as a percentage. The correct solution is identified by an asterisk (*) following the percent of students selecting the option. The column marked "NR" presents the percent of students who did respond to the item. The reporting of data for grade 3 completion items is explained in Chapter 2.

Subtests

The categories and subtests identified at each grade level are listed at the beginning of the chapter which reports that grade level's results. The test items corresponding to each subtest are specified. Data include mean raw scores and corresponding percents, standard deviation or standard error of measurement.

SAMPLING DESIGN

Grades 3 and 6. Grades 3 and 6 students were selected for testing by a systematic random sampling design. Ten percent of students in every public classroom was selected for the assessment.

Grades 9 and 12 (300 and 301). The sampling design used was a stratified cluster sampling design with schools as clusters and stratification done on a geographic basis. Schools (clusters) were selected with probability proportional to school enrollment. Means, proportions, and standard errors were computed employing a computer program specially developed by the Statistical Advisory Service, University of Manitoba. Both the number of students tested (n) as well as degrees of freedom (d.f.) are reported for the core topics of the relevant grades.

Providing provincial data on option topics posed certain difficulties since students were requested to answer items in two options only at each of these grade levels. The classroom mathematics teachers chose the two options which their students were to write. Option mean scores therefore, were provided on a stratum basis. Stratum mean scores must be interpreted with caution since not all students in a given stratum chose the same options.

The strata were described as:

Stratum	Grade 9	Stratum	Grade 12
1	Urban	1	Urban
2	Hutterite	2	Rural small town
3	Other city/Large town	3	Other city/Large town
4	Remote/Northern	4	Remote/Northern
5	Rural/Small town		

Mean scores, percents, and numbers of students (n) are reported. it is meaningless to report standard errors for these option scores.

A Cautionary Note Regarding the Use of These Results

The Mathematics Assessment was designed to assess the goals and objectives of the Manitoba curriculum with the intent to identify strengths and weaknesses of the program. The written tests can be used to measure group performance and analyze the effectiveness of local programs, but are not intended to measure the achievement of individual students. If students' results on these tests are to be used for reporting purposes, they should be used only in conjunction with other information gathered on the students.

CHAPTER 2

PROVINCIAL RESULTS - GRADE 3

n=1282

Subtest		Item Numbers	Mean Raw Score	Per Cent	Standard Deviation
I.1	Concepts of Whole Number	1-7	5.44	77.71	1.28
I.2	Place Value	8-11	3.46	86.47	0.94
I.3	Addition & Subtraction	12-36	17.34	69.36	4.53
I.4	Multiplication & Division	51-72	15.85	72.03	5.34
I.5	Fractions	73-76	2.46	61.60	1.37
I.6	Patterns	77-79	2.66	88.56	0.68
I.	NUMBER SYSTEMS - TOTAL (65 items)		**47.21**	**72.62**	**10.84**
II.1	Linear Measurement	80-88	6.14	68.27	2.24
II.2	Area and Volume	89-92	2.17	54.27	1.37
II.3	Money, Time & Temperature	93-98	3.92	65.26	1.85
II.	MEASUREMENT - TOTAL (19 items)		**12.23**	**64.37**	**4.45**
III.	GEOMETRY	37-44	**6.22**	**77.78**	**1.86**
IV.	GRAPHING	45-46 99-100	**3.12**	**78.06**	**1.11**
V.	PROBLEM SOLVING	47-50	**1.21**	**30.36**	**1.10**
VI.	WORD PROBLEMS*	33-36 71-72 88 47-50	**5.62**	**51.11**	**2.72**
VII.	ESTIMATION*	22-23 31-32	**0.92**	**23.01**	**1.06**

* Subtests VI and VII contain items that overlap from other subtests.

PROVINCIAL RESULTS

MATHEMATICS ASSESSMENT 1987 - GRADE 3

This grade 3 test contains 100 items. Some are multiple-choice while others are completion items. The data below describe student responses in this way.

1. If the item is multiple-choice, the data indicate the percentage of students choosing each response. The correct response is indicated by an asterisk.

2. If the item is a completion type of question, the percentage of students who answered the question completely correctly is indicated as the "A" response. The percents in the remaining positions (B,C,D,E) relate to the percentage of students who made specific errors.

Examples

Item 21	A*)	77.6%	these students had the answer correct
	B)	12.6%	calculaion/fact error
	C)	0.1%	operation error
	D)	4.1%	regrouping error
	E)	4.5%	unidentifiable error
		1.1%	no response
Item 29	A*)	59.0%	these students had the answer correct
	B)	3.7%	calculation/fact error
	C)	26.2%	reversal or subtraction from 0 error
	D)	3.3%	regrouping error
	E)	5.8%	unidentifiable error
		2.0%	no response

These two sets of error patterns were used for all addition and subtraction items. Errors for other questions are described in the Final Report of the Mathematics Assessment.

QUESTION	A	B	C	D	E	NR
1	98.0*	0.6	0.3	0.0	0.4	0.6
2	91.5*	1.9	0.2	0.2	4.6	1.6
3	79.7*	12.2	0.1	0.2	5.9	1.9
4	0.4	1.5	0.9	96.1*	0.8	0.4
5	86.3*	8.7	0.9	2.0	1.2	0.9
6	50.1*	5.1	18.2	0.1	21.6	4.9
7	42.3*	6.8	8.3	14.2	23.3	5.1
8	85.6*	8.8	3.5	0.0	1.2	0.9

QUESTION	A	B	C	D	E	NR
9	89.9*	4.2	4.1	0.0	0.7	1.1
10	4.2	87.0*	7.1	0.0	0.8	0.9
11	2.2	11.7	83.5*	0.2	0.9	1.6
12	94.8*	1.2	0.3	0.2	2.1	1.4
13	88.0*	4.8	0.2	3.3	2.1	1.6
14	94.1*	3.0	0.0	0.2	1.4	1.2
15	78.6*	11.2	0.0	3.4	4.8	2.0
16	94.9*	1.7	0.1	0.2	1.3	1.9
17	91.5*	2.0	0.0	3.1	2.4	1.0
18	73.8*	12.5	0.1	6.6	5.5	1.5
19	93.3*	3.3	0.0	0.2	1.8	1.5
20	83.7*	6.9	0.1	3.3	4.6	1.4
21	77.6*	12.6	0.1	4.1	4.5	1.1
22	10.6	2.9	11.9*	72.1	0.3	2.3
23	13.7*	10.5	67.3	5.9	0.1	2.5
24	90.6*	2.9	2.8	0.2	1.7	1.8
25	60.0*	3.5	25.7	2.7	5.7	2.3
26	88.5*	3.8	0.8	0.9	4.4	1.6
27	60.4*	3.8	23.5	3.5	6.6	2.2
28	93.3*	1.6	2.3	0.2	1.2	1.5
29	59.0*	3.7	26.2	3.3	5.8	2.0
30	59.6*	3.4	25.5	2.9	5.9	2.7
31	9.3	38.3*	41.9	7.2	0.2	3.1
32	48.5	28.2*	11.2	7.8	0.3	3.9
33	76.8*	6.2	1.2	1.2	10.6	3.9
34	58.3*	6.9	6.5	1.1	22.5	4.8
35	69.9*	8.9	1.2	2.4	12.6	4.9
36	55.3*	13.0	6.9	1.6	16.8	6.2
37	92.1*	1.9	1.5	0.0	0.1	4.4
38	1.6	85.3*	8.0	0.0	0.5	4.5
39	81.1*	4.8	2.0	0.1	6.0	5.9
40	1.0	80.9*	0.4	0.8	11.9	5.1
41	4.8	14.2	53.8*	4.3	15.7	7.3
42	67.6*	1.2	0.4	18.1	3.9	8.9

QUESTION	A	B	C	D	E	NR
43	80.0*	0.0	0.2	0.0	12.0	7.8
44	81.4*	0.0	0.0	0.0	10.8	7.8
45	90.9*	0.1	0.1	0.0	1.6	7.3
46	72.2*	6.8	5.5	0.5	7.4	7.6
47	32.8*	17.7	29.5	0.0	8.9	11.2
48	6.8*	10.0	47.0	17.7	7.3	11.2
49	40.6*	42.2	0.2	0.1	5.7	11.3
50	41.3*	14.8	10.4	8.0	13.1	12.4
51	78.5*	9.2	0.4	0.2	9.4	2.3
52	89.0*	3.6	0.6	0.1	4.4	2.3
53	83.9*	5.9	0.4	0.1	7.6	2.2
54	82.0*	8.0	0.4	0.1	6.5	3.1
55	93.1*	1.6	0.5	0.1	3.0	1.7
56	56.3*	4.9	5.5	0.5	28.2	4.5
57	65.4*	5.7	4.5	0.5	20.4	3.4
58	71.5*	2.3	3.4	0.3	18.4	4.2
59	67.9*	3.3	3.5	0.3	20.4	4.5
60	56.6*	4.7	2.1	0.2	30.8	5.5
61	38.2*	8.3	3.2	3.8	38.5	8.0
62	68.9*	7.9	2.0	0.0	13.3	8.0
63	75.8*	5.1	1.8	0.1	9.5	7.6
64	72.3*	5.0	1.7	0.1	11.7	9.2
65	77.8*	2.5	2.0	0.1	9.2	8.3
66	66.7*	7.9	1.8	0.1	14.0	9.6
67	80.4*	2.6	2.0	0.1	6.6	8.3
68	73.3*	2.0	9.2	0.0	7.5	8.0
69	89.5*	0.5	0.0	0.0	3.9	6.1
70	80.0*	4.0	1.5	0.1	6.9	7.6
71	67.3*	0.9	23.6	0.0	5.5	2.7
72	49.9*	3.5	20.7	0.0	19.1	6.8
73	69.8*	8.1	3.2	3.1	11.0	4.8
74	61.5*	8.1	8.8	3.1	14.0	4.4
75	63.0*	11.8	0.9	0.9	18.2	5.1
76	52.0*	2.4	24.7	4.3	10.5	6.0

QUESTION	A	B	C	D	E	NR
77	80.6*	2.5	1.5	0.0	11.1	4.4
78	91.8*	1.6	0.0	1.6	1.8	3.2
79	93.3*	0.2	0.2	1.0	2.3	3.0
80	12.2	14.0	69.0*	0.0	0.1	4.6
81	64.0*	10.2	21.1	0.0	0.2	4.4
82	14.0	64.6*	16.6	0.0	0.1	4.7
83	21.5	18.3	55.6*	0.1	0.2	4.4
84	32.4	59.3*	0.2	0.0	0.2	7.8
85	81.9*	12.2	0.1	0.0	0.2	5.6
86	91.1*	0.3	0.2	0.0	2.8	5.6
87	5.1	65.7*	23.9	0.1	0.1	5.1
88	63.2*	10.7	0.3	1.4	16.3	8.1
89	64.0*	2.2	1.1	8.2	14.1	10.5
90	47.1*	12.8	3.4	10.4	14.8	11.5
91	32.9	58.4*	0.0	0.1	0.1	8.5
92	47.6*	44.0	0.0	0.0	0.2	8.3
93	49.1*	3.7	9.3	16.8	12.9	8.1
94	20.1	7.0	55.0*	8.5	0.4	9.0
95	73.5*	15.8	0.9	0.0	0.2	9.8
96	10.3	5.7	73.7*	0.1	0.1	10.1
97	4.1	5.5	69.1*	8.8	1.7	10.7
98	71.1*	11.2	2.3	0.1	5.1	10.1
99	85.2*	0.1	0.2	0.1	3.7	10.7
100	64.0*	4.1	2.6	0.0	17.8	11.5

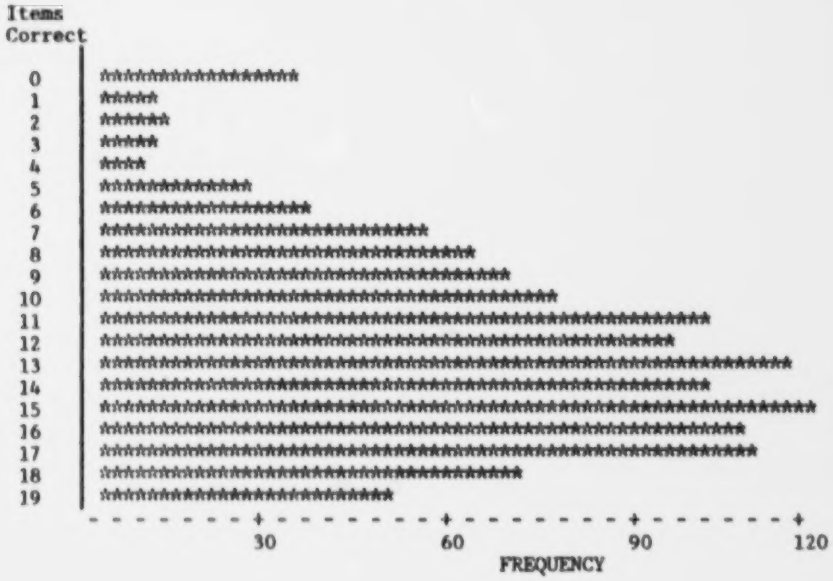
GRADE 3 - I. NUMBER SYSTEMS, OPERATIONS, PROPERTIES

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	*	1	1	0.08	0.08
7	*	1	2	0.08	0.16
10	*	1	3	0.08	0.23
11	**	2	5	0.16	0.39
12	*	1	6	0.08	0.47
14	**	2	8	0.16	0.62
15	****	4	12	0.31	0.94
16	***	3	15	0.23	1.17
17	****	4	19	0.31	1.48
18	***	3	22	0.23	1.72
19	******	6	28	0.47	2.18
20	**	2	30	0.16	2.34
21	*****	5	35	0.39	2.73
22	*******	7	42	0.55	3.28
23	******	6	48	0.47	3.74
24	******	6	54	0.47	4.21
25	******	6	60	0.47	4.68
26	******	6	66	0.47	5.15
27	********	8	74	0.62	5.77
28	**********	16	90	1.25	7.02
29	**********	14	104	1.09	8.11
30	********	8	112	0.62	8.74
31	**********	11	123	0.86	9.59
32	**********	15	138	1.17	10.76
33	**********	16	154	1.25	12.01
34	**********	17	171	1.33	13.34
35	**********	15	186	1.17	14.51
36	**********	18	204	1.40	15.91
37	**********	30	234	2.34	18.25
38	**********	24	258	1.87	20.12
39	**********	16	274	1.25	21.37
40	**********	28	302	2.18	23.56
41	**********	27	329	2.11	25.66
42	**********	31	360	2.42	28.08
43	**********	45	405	3.51	31.59
44	**********	36	441	2.81	34.40
45	**********	49	490	3.82	38.22
46	**********	35	525	2.73	40.95
47	**********	42	567	3.28	44.23
48	**********	48	615	3.74	47.97
49	**********	29	644	2.26	50.23
50	**********	44	688	3.43	53.67
51	**********	44	732	3.43	57.10
52	**********	57	789	4.45	61.54
53	**********	37	826	2.89	64.43
54	**********	69	895	5.38	69.81
55	**********	68	963	5.30	75.12
56	**********	44	1007	3.43	78.55
57	**********	55	1062	4.29	82.84
58	**********	53	1115	4.13	86.97
59	**********	61	1176	4.76	91.73
60	**********	41	1217	3.20	94.93
61	**********	37	1254	2.89	97.82
62	**********	11	1265	0.86	98.67
63	********	8	1273	0.62	99.30
64	*****	5	1278	0.39	99.69
65	****	4	1282	0.31	100.00

15 30 45 60

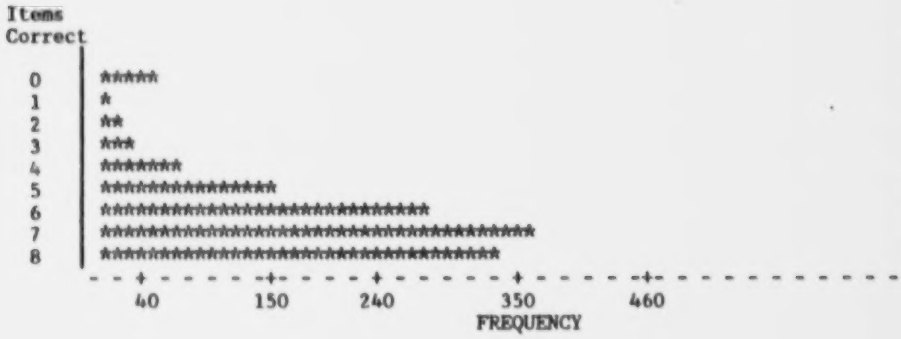
FREQUENCY

GRADE 3 - II. MEASUREMENT



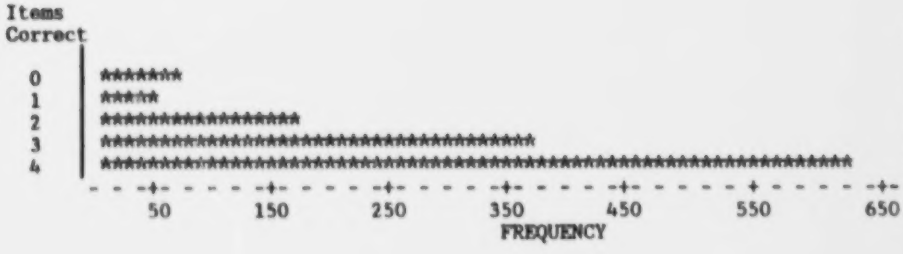
Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	34	34	2.65	2.65
1	9	43	0.70	3.35
2	11	54	0.86	4.21
3	10	64	0.78	4.99
4	8	72	0.62	5.62
5	26	98	2.03	7.64
6	35	133	2.73	10.37
7	55	188	4.29	14.66
8	63	251	4.91	19.58
9	69	320	5.38	24.96
10	78	398	6.08	31.05
11	103	501	8.03	39.08
12	98	599	7.64	46.72
13	118	717	9.20	55.93
14	103	820	8.03	63.96
15	121	941	9.44	73.40
16	109	1050	8.50	81.90
17	112	1162	8.74	90.64
18	71	1233	5.54	96.18
19	49	1282	3.82	100.00

GRADE 3 - III. GEOMETRY



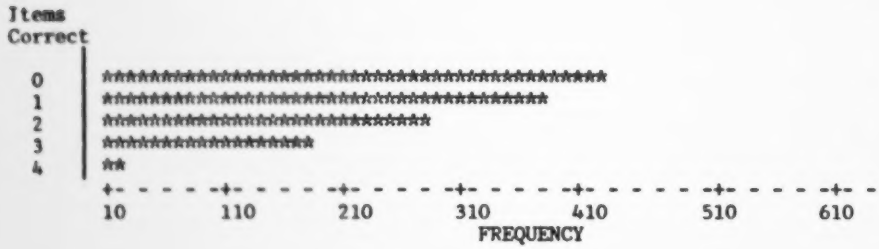
Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	45	45	3.51	3.51
1	9	54	0.70	4.21
2	17	71	1.33	5.54
3	28	99	2.18	7.72
4	65	164	5.07	12.79
5	148	312	11.54	24.34
6	276	588	21.53	45.87
7	358	946	27.93	73.79
8	336	1282	26.21	100.00

GRADE 3 - IV. GRAPHING



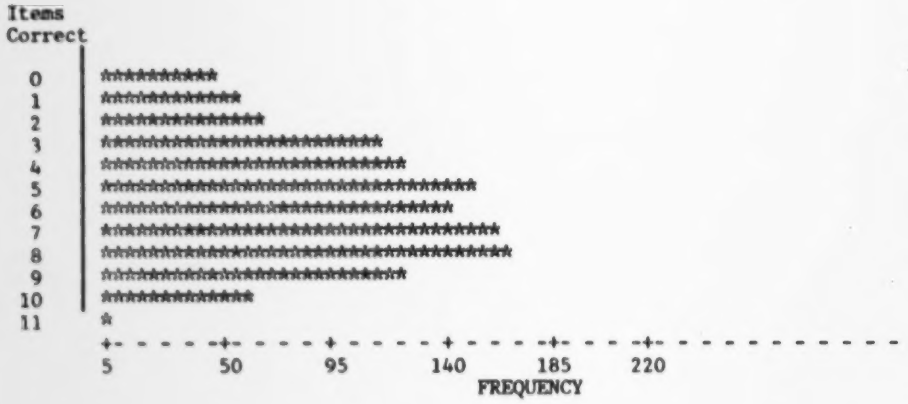
Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	67	67	5.23	5.23
1	50	117	3.90	9.13
2	171	288	13.34	22.46
3	365	653	28.47	50.94
4	629	1282	49.06	100.00

GRADE 3 - V. PROBLEM SOLVING



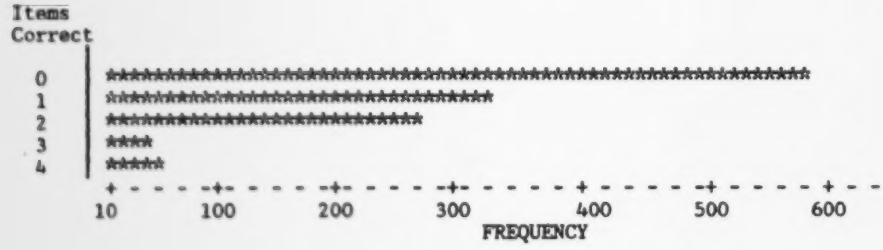
Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	425	425	33.15	33.15
1	382	807	29.80	62.95
2	273	1080	21.29	84.24
3	179	1259	13.96	98.21
4	23	1282	1.79	100.00

GRADE 3 - VI. WORD PROBLEMS



Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	51	51	3.98	3.98
1	63	114	4.91	8.89
2	72	186	5.62	14.51
3	122	308	9.52	24.02
4	131	439	10.22	34.24
5	156	595	12.17	46.41
6	146	741	11.39	57.80
7	165	906	12.87	70.67
8	168	1074	13.10	83.78
9	132	1206	10.30	94.07
10	69	1275	5.38	99.45
11	7	1282	0.55	100.00

GRADE 3 - VII. ESTIMATION



Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	593	593	46.26	46.26
1	330	923	25.74	72.00
2	274	1197	21.37	93.37
3	38	1235	2.96	96.33
4	47	1282	3.67	100.00

CHAPTER 3

PROVINCIAL RESULTS - GRADE 6

n=1391

Subtest		Item Numbers	Mean Raw Score	Per Cent	Standard Deviation
I.1	Place Value, Regrouping...	1-8	5.39	67.36	1.99
I.2	Equalities and Inequalities	9-12	2.87	71.80	0.99
I.3	Factors and Primes....	13-16	2.26	56.38	1.03
I.4	Properties	17-20	2.88	71.93	1.22
I.5	Addition and Subtraction	21-27	4.85	69.27	1.39
I.6	Multiplication Whole Numbers	28-32	3.57	71.46	1.07
I.7	Division of Whole Numbers	51-56	3.62	60.27	1.44
I.8	Fractions and Percent	57-63	4.51	64.50	1.93
I.9	Operations with Fractions	64-71	4.07	50.84	2.44
I.10	Operations with Decimals	72-78	3.51	50.21	1.79
I.	NUMBER SYSTEMS, OPERATIONS - TOTAL (60 items)		**37.53**	**62.55**	**11.00**
II.	MEASUREMENT	33-41	**4.89**	**54.31**	**2.06**
III.	GEOMETRY	42-49	**4.79**	**59.88**	**1.94**
IV.	GRAPHING	79-84	**4.56**	**76.07**	**1.47**
V.	PROBLEM SOLVING	85-87 89-90	**1.33**	**26.57**	**1.06**
VI.	WORD PROBLEMS*	24, 56, 67, 70, 75, 85-87 89, 90	**4.34**	**43.38**	**2.01**

* Subtest VI contains items that overlap from other subtests.

PRELIMINARY REPORT

PROVINCIAL RESULTS

MATHEMATICS ASSESSMENT 1987 - GRADE 6

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

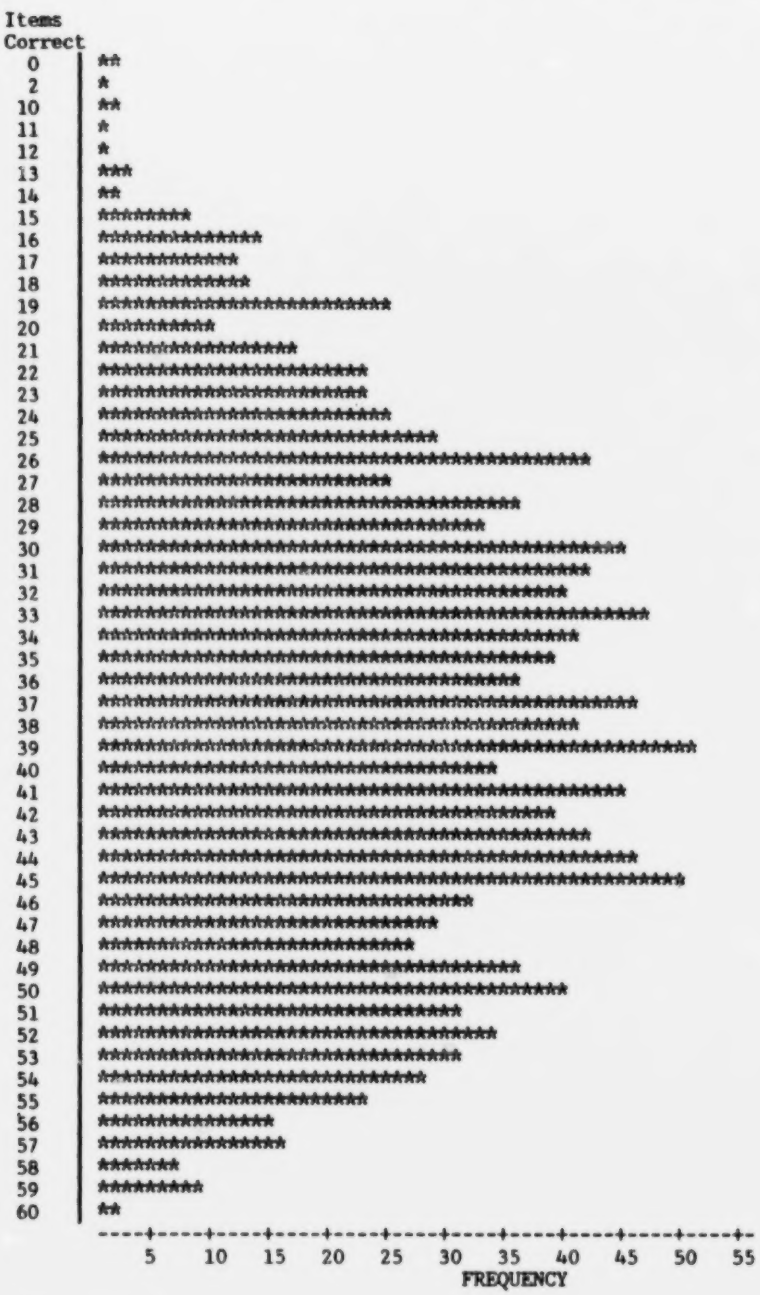
(* INDICATES CORRECT RESPONSE)

QUESTION	A	B	C	D	E	NR
1	23.8	70.8*	2.8	2.2	0.1	0.4
2	15.6	5.9	6.9	71.2*	0.1	0.3
3	15.5	55.0*	12.1	15.8	0.3	1.3
4	10.7	78.1*	6.3	4.0	0.0	0.9
5	6.5	82.7*	8.2	2.0	0.0	0.6
6	8.6	5.9	20.1	64.6*	0.3	0.5
7	10.9	8.0	56.6*	23.9	0.2	0.4
8	59.7*	7.8	12.3	19.6	0.1	0.4
9	4.6	2.8	88.9*	3.2	0.0	0.5
10	11.6	15.5	53.3*	18.5	0.3	0.8
11	4.7	2.0	2.2	89.9*	0.4	0.8
12	55.1*	32.8	11.1	0.4	0.1	0.5
13	6.9	22.0	45.8	24.0*	0.1	1.2
14	49.7*	22.2	15.4	10.7	0.4	1.5
15	77.4*	6.2	5.3	9.8	0.0	1.3
16	5.4	5.6	13.9	74.3*	0.3	0.4
17	68.5*	17.8	5.5	7.1	0.2	0.9
18	4.9	6.9	66.1*	20.3	0.7	1.0
19	15.1	58.5*	8.1	16.6	0.6	1.1
20	0.9	94.5*	1.0	2.8	0.2	0.5
21	1.5	0.6	0.5	96.8*	0.1	0.4
22	12.3	1.4	3.7	81.7*	0.1	0.8
23	6.9	21.8	64.8*	5.8	0.1	0.7
24	66.9*	14.6	13.4	3.6	0.4	1.0
25	0.9	2.0	2.3	93.6*	0.3	0.9
26	14.0	53.4*	13.6	17.0	0.9	1.2
27	8.1	27.7*	22.2	41.0	0.3	0.6

QUESTION	A	B	C	D	E	NR
28	14.5	75.6*	6.1	3.1	0.2	0.6
29	84.1*	12.1	2.4	0.8	0.0	0.6
30	1.2	5.7	2.5	89.3*	0.8	0.6
31	7.9	80.8*	6.0	3.9	0.6	0.8
32	6.6	27.5*	34.5	30.2	0.4	0.7
33	63.5*	23.2	7.9	2.4	2.2	0.9
34	5.0	88.9*	1.9	1.5	1.6	1.2
35	76.6*	6.8	11.4	4.0	0.1	1.1
36	23.0	6.0	34.6*	9.1	26.1	1.2
37	1.9	5.2	70.4*	4.6	17.1	0.8
38	15.9	16.0	11.7	26.7	28.7*	0.9
39	57.2*	13.4	18.1	9.6	0.6	1.1
40	23.7*	39.4	10.4	11.9	13.2	1.4
41	2.2	0.8	45.2*	5.0	45.8	1.0
42	3.8	21.4	60.5*	12.9	0.1	1.2
43	7.9	37.5	14.3	38.2*	0.1	2.0
44	11.1	60.3*	11.4	14.7	0.4	2.2
45	15.5	13.9	56.9*	11.2	0.5	1.9
46	11.9	4.0	78.0*	3.7	0.1	2.3
47	23.9	7.5	56.8*	9.8	0.1	1.9
48	25.3	5.8	15.3	51.7*	0.1	1.8
49	76.6*	6.1	9.6	5.8	0.2	1.8
50	ITEM NO. 50 NOT SCORED - ERROR IN DIAGRAM					
51	12.7	72.3*	4.5	9.3	0.1	1.1
52	56.0	15.2	1.0	26.3*	0.4	1.1
53	4.4	84.3*	6.8	3.4	0.4	0.9
54	10.1	70.4*	9.9	7.7	0.8	1.2
55	19.1	6.4	15.1	36.4*	21.5	1.5
56	1.9	8.6	72.0*	15.3	0.9	1.3
57	8.7	67.0*	5.3	16.9	1.1	1.0
58	4.5	29.3	8.1	56.6*	0.4	1.1
59	67.1*	5.3	9.1	17.2	0.4	0.9
60	24.2	12.2	61.0*	0.7	0.1	1.7
61	16.3	5.8	70.7*	5.5	0.3	1.4

QUESTION	A	B	C	D	E	NR
62	3.2	79.8*	7.0	9.0	0.1	0.9
63	35.4	7.2	7.0	49.2*	0.3	0.9
64	18.8	70.6*	7.9	1.9	0.0	0.8
65	7.6	34.9	50.7*	5.2	0.4	1.2
66	53.8*	12.4	28.5	4.0	0.4	0.9
67	44.3*	23.4	20.0	10.6	0.4	1.4
68	36.4	13.4	4.6	44.3*	0.4	0.9
69	44.4*	12.7	19.3	22.0	0.7	0.9
70	13.9	57.9*	12.8	14.1	0.3	1.1
71	18.3	30.4	8.5	40.8*	0.6	1.4
72	23.1*	13.7	56.6	5.3	0.4	0.9
73	23.7	4.8	5.0	65.1*	0.2	1.2
74	3.9	85.8*	7.3	2.0	0.1	0.9
75	14.5	16.0	7.8	59.9*	0.5	1.4
76	18.2	21.7	47.2*	11.5	0.4	1.1
77	12.7	48.0*	28.2	8.8	0.7	1.6
78	22.6*	5.4	54.0	15.6	0.6	1.8
79	1.5	9.5	64.1*	13.6	9.6	1.7
80	4.4	3.8	3.0	80.7*	6.2	1.9
81	1.2	2.4	93.0*	1.5	0.2	1.7
82	4.5	9.6	50.1*	33.1	0.9	1.7
83	82.6*	9.1	3.1	3.2	0.1	1.9
84	6.5	2.6	2.9	86.0*	0.1	1.9
85	6.6	28.3	52.8*	9.6	0.2	2.5
86	3.7	18.0*	4.5	57.7	13.7	2.4
87	9.3	10.9	10.3	27.6	38.8*	3.1
	ITEM NO. 88 WAS NOT INCLUDED IN ANY SUBTEST ANALYSES					
88	10.1	21.1	21.6	44.0	0.9	2.4
89	7.2	3.7	60.8	11.5*	14.2	2.5
90	19.7	49.6	11.8*	16.2	0.4	2.3

GRADE 6 - I. NUMBER SYSTEMS, OPERATIONS, AND PROPERTIES



Items Correct	FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	2	2	0.14	0.14
2	1	3	0.07	0.21
10	2	5	0.14	0.35
11	1	6	0.07	0.42
12	1	7	0.07	0.49
13	3	10	0.22	0.71
14	2	12	0.14	0.85
15	8	20	0.58	1.43
16	14	34	1.01	2.44
17	12	46	0.86	3.30
18	13	59	0.93	4.23
19	25	84	1.80	6.03
20	10	94	0.72	6.75
21	17	111	1.22	7.97
22	23	134	1.65	9.62
23	23	157	1.65	11.27
24	25	182	1.80	13.07
25	29	211	2.08	15.15
26	42	253	3.02	18.17
27	25	278	1.80	19.97
28	36	314	2.59	22.56
29	33	347	2.37	24.93
30	45	392	3.24	28.17
31	42	434	3.02	31.19
32	40	474	2.88	34.07
33	47	521	3.38	37.45
34	41	562	2.95	40.40
35	39	601	2.80	43.20
36	36	637	2.59	45.79
37	46	683	3.31	49.10
38	41	724	2.95	52.05
39	51	775	3.67	55.72
40	34	809	2.44	58.16
41	45	854	3.24	61.40
42	39	893	2.80	64.20
43	42	935	3.02	67.22
44	46	981	3.31	70.53
45	50	1031	3.59	74.12
46	32	1063	2.30	76.42
47	29	1092	2.08	78.50
48	27	1119	1.94	80.44
49	36	1155	2.59	83.03
50	40	1195	2.88	85.91
51	31	1226	2.23	88.14
52	34	1260	2.44	90.58
53	31	1291	2.23	92.81
54	28	1319	2.01	94.82
55	23	1342	1.65	96.47
56	15	1357	1.08	97.55
57	16	1373	1.15	98.71
58	7	1380	0.50	99.21
59	9	1389	0.65	99.86
60	2	1391	0.14	100.00

1* = 1 student

GRADE 6 - II. MEASUREMENT

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	****	21	21	1.51	1.51
1	*******	37	58	2.66	4.17
2	************************	119	177	8.55	12.72
3	*************************************	182	359	13.08	25.81
4	**	263	622	18.91	44.72
5	***	244	866	17.54	62.26
6	**	192	1058	13.80	76.06
7	**********************************	167	1225	12.01	88.07
8	************************	109	1334	7.84	95.90
9	**********	57	1391	4.10	100.00

20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
FREQUENCY

GRADE 6 - III. GEOMETRY

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	****	20	20	1.44	1.44
1	**********	49	69	3.52	4.96
2	************************	109	178	7.84	12.80
3	**	191	369	13.73	26.53
4	**	243	612	17.47	44.00
5	**	250	862	17.97	61.97
6	**	219	1081	15.74	77.71
7	**	193	1274	13.87	91.59
8	************************	117	1391	8.41	100.00

20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
FREQUENCY

GRADE 6 - IV. GRAPHING

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	****	30	30	2.16	2.16
1	*****	39	69	2.80	4.96
2	*********	72	141	5.18	10.14
3	******************	134	275	9.63	19.77
4	**********************************	264	539	18.98	38.75
5	**	404	943	29.04	67.79
6	**	448	1391	32.21	100.00

40 80 120 160 200 240 280 320 360 400 440
FREQUENCY

GRADE 6 - V. PROBLEM SOLVING

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	**********	337	337	24.23	24.23
1	**********	496	833	35.66	59.88
2	**********	372	1205	26.74	86.63
3	**********	146	1351	10.50	97.12
4	***	30	1381	2.16	99.28
5	*	10	1391	0.72	100.00

40 80 120 160 200 240 280 320 360 400 440 480 520

FREQUENCY

GRADE 6 - VI. WORD PROBLEMS

Items Correct		FREQ	CUM. FREQ	PERCENT	CUM PERCENT
0	*****	24	24	1.73	1.73
1	**********	78	102	5.61	7.33
2	**********	171	273	12.29	19.63
3	**********	233	506	16.75	36.38
4	**********	242	748	17.40	53.77
5	**********	236	984	16.97	70.74
6	**********	199	1183	14.31	85.05
7	**********	118	1301	8.48	93.53
8	**********	68	1369	4.89	98.42
9	***	17	1386	1.22	99.64
10	*	5	1391	0.36	100.00

20 80 140 200 260

FREQUENCY

CHAPTER 4

PROVINCIAL RESULTS - GRADE 9

Core Topics n=2138 df=24

Subtest	Number of Items	Mean Score	Standard Error of Measurement	Percent
1. Real Number Systems	13	6.47	0.052	49.8
2. Construction Geometry	5	2.54	0.021	50.8
3. Open Expressions	10	6.16	0.050	61.6
4. Equations	8	4.85	0.045	60.6
5. Word Problems (routine)	11	5.87	0.039	53.4
6. Word Problems (non-routine)	5	2.26	0.019	45.2
Part A Non-Calculator	25	13.88	0.101	55.5
Part B Calculator use	27	14.29	0.095	52.9

Item Numbers Appearing in each Subtest

CORE TOPICS	ITEM NUMBERS Part A	Part B
1. Real Number System	1-3	54
	5,6	61
	8-11	
	15,16	
2. Construction Geometry	24	51
	25	71
		72
3. Open Expressions	13,14	56-60
	17-19	
4. Equations	20-23	62-65
5. Word Problems (routine)	4	52,53
	7	55
	12	66-70
6. Word Problems (non-routine)		73-77
7. Part A (non-calculator)	1-25	
8. Part B (calculator use)		51-77

Options (Do 2 of 5) Option No.	Part C
1. Algebra	101-105
2. Consumer Related Topics	111-115
3. Coordinate Graphing	121-125
4. Statistics	131-135
5. Geometry	141-145

Grade 9 - Option Topics
(Each option has 5 items)

Option 1 - Algebra

n=2021 df=21

Mean Score	Standard Error of Measure	Percent
2.2802	0.027	45.6

Provincial data are reported for this option as 95% of students selected it as one of their two options. Other options were selected by a much smaller number of students; therefore data are reported on a stratum basis. These data should be interpreted with cauttion as not all sample schools within a stratum chose the same options.

Option 2 - Consumer Related Topics

	n	Mean	Percent
Stratum 1	485	2.5070	50.1
2	Insufficient number of students		
3	191	3.7134	74.3
4	12	3.0833	61.7
5	105	3.1301	62.6

Option 3 - Coordinate Graphing

	n	Mean	Percent
Stratum 1	235	2.3382	46.8
2	Insufficient number of students		
3	148	1.8446	36.9
4	36	1.9167	38.3
5	270	2.3523	47.0

Option 4 - Statistics

	n	Mean	Percent
Stratum 1	17	1.4667	29.3
2	Insufficient number of students		
3	-	-*	
4	-	-*	
5	25	3.6000	72.0

Option 5 - Geometry

	n	Mean	Percent
Stratum 1	519	2.3585	47.2
2	-	-*	
3	-	-*	
4	18	1.5556	31.1
5	158	2.6723	53.4

*No students in the stratum selected this option.

P R E L I M I N A R Y R E P O R T

P R O V I N C I A L R E S U L T S

MATHEMATICS ASSESSMENT 1987 - GRADE 9

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)

QUESTION PART A	A	B	C	D	E	NR
1	26.9	50.3*	9.5	8.9	4.0	0.4
2	12.1	56.1*	6.8	10.3	14.3	0.4
3	29.8	8.3	41.6*	10.8	9.3	0.2
4	3.2	9.6	22.7	60.9*	3.5	0.1
5	49.4*	11.0	4.9	30.2	4.3	0.2
6	31.8*	27.2	6.1	12.1	22.2	0.6
7	6.0	4.1	60.9*	10.2	18.5	0.3
8	6.7	38.8	17.8	28.8*	7.2	0.7
9	75.4*	7.2	10.9	4.4	1.9	0.2
10	19.4	6.5	12.3	51.1*	10.3	0.4
11	6.3	21.0	10.6	5.6	56.4*	0.1
12	2.4	57.9	9.2	3.7	26.5*	0.3
13	70.9*	7.9	6.1	6.6	7.7	0.8
14	11.7	3.4	15.7	63.3*	5.1	0.8
15	8.0	4.6	62.6*	6.5	17.9	0.4
16	7.8	35.4*	10.9	4.8	40.8	0.3
17	6.1	6.2	76.5*	8.2	2.5	0.5
18	23.0	5.8	38.6	29.7*	2.5	0.4
19	5.7	69.1*	7.7	13.1	3.7	0.7
20	14.6	5.1	70.5*	8.0	1.3	0.5
21	1.9	3.6	87.6*	4.7	1.6	0.6

QUESTION	A	B	C	D	E	NR
22	11.3	5.1	5.2	5.1	72.5*	0.8
23	63.9*	19.5	6.8	5.3	3.4	1.1
24	21.2	17.4	19.6	7.8	32.5*	1.5
25	3.0	10.0	11.8	8.8	64.1*	2.3
PART B						
51	2.4	24.0	7.0	60.0*	6.1	0.5
52	5.8	77.4*	5.4	4.4	6.9	0.1
53	71.7*	11.5	6.7	5.4	4.5	0.2
54	6.6	4.8	53.4*	28.4	6.1	0.7
55	44.1	26.1*	16.7	3.7	8.7	0.7
56	14.4	69.0*	7.5	5.3	3.4	0.4
57	6.5	71.8*	10.4	6.4	4.5	0.4
58	9.8	2.8	17.2	7.4	62.6*	0.2
59	23.1	10.8	39.8*	16.8	8.9	0.6
60	13.0	12.8	6.3	3.6	63.7*	0.6
61	8.3	12.3	55.1*	9.5	14.5	0.3
62	9.9	12.8	12.7	54.7*	9.1	0.8
63	42.1*	11.6	21.4	14.5	9.9	0.5
64	12.6	12.8	20.2	9.2	44.3*	0.9
65	6.8	16.0	49.7*	16.0	9.9	1.6
66	16.4	8.5	9.8	56.3*	8.3	0.7
67	31.9	19.7	34.6*	7.4	6.1	0.3
68	5.8	7.7	77.9*	5.5	2.7	0.4
69	37.2*	16.9	14.1	24.0	6.6	1.2
70	4.9	9.0	26.5	57.8*	1.4	0.4
71	33.3*	35.3	12.4	7.0	11.2	0.8

QUESTION	A	B	C	D	E	NR
72	7.6	64.3*	20.1	4.7	3.0	0.3
73	31.3	11.0	38.5*	5.1	13.5	0.6
74	70.9*	7.8	5.4	3.2	12.2	0.5
75	2.6	4.9	6.7	60.9*	25.2	-
76	9.3	19.2	23.6	21.4	25.1*	1.4
77	5.3	18.8	19.4	30.7*	23.6	2.2

Individual item data were not produced for the five option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.

CHAPTER 5

PROVINCIAL RESULTS - GRADE 12

Grade 12 - 300
Core Topics n=710 df=14

	Number of Items	Mean Score	Standard Error of Measurement	Percent
1. Polynomials and Rational Functions	8	4.49	0.038	56.1
2. Circular Functions	11	4.72	0.034	42.9
3. Analytic Geometry	4	1.75	0.024	43.8
4. Exponents and Logarithms	4	1.61	0.023	40.3
5. Sequences and Series	4	1.66	0.023	41.5

Item Numbers Appearing in each Subtest

	CORE TOPICS	ITEM NUMBERS
CI	Polynomials and Rational Functions	1-8
CII	Circular Functions	9-19
CIII	Analytic Geometry	20-23
CIV	Exponents and Logarithms	24-27
CV	Sequences and Series	28-31
	OPTION TOPICS	
O.I	Binomial Theorem	35-38
O.II	Compound Interest	41-44
O.III	Sinusoidal Functions	51-54
O.IV	Circular Functions	61-64
O.V	Permutations and Combinations	71-74
O.VI	Conic Sections	81-84
O.VII	Transformations of Conics	91-94

Math 300 - Option Topics
(Each option has 4 items)

Provincial data are not reported for the options because of the low numbers of students selecting any given option in certain strata. Stratum scores should be interpreted with caution as not all sample schools within a stratum chose the same options.

Option 1 - Binomial Theorem

	n	mean	percent
Stratum 1	158	1.7367	43.4
2	104	1.6997	42.5
3	44	2.5682	64.2
4	5	1.2000	30.0

Option 2 - Compound Interest

	n	mean	percent
Stratum 1	16	1.1875	29.7
2	-	-*	-
3	-	-	-
4	15	0.7333	18.3

Option 3 - Sinusoidal Functions

	n	mean	percent
Stratum 1	3	1.3333	33.3
2	36	0.8079	20.2
3	-	-	-
4	28	0.9194	23.0

Option 4 - Circular Functions

	n	mean	percent
Stratum 1	4	1.0000	25.0
2	7	0.5714	14.3
3	37	1.1351	28.4
4	8	0.8750	21.9

Option 5 - Permutations and Combinations

	n	mean	percent
Stratum 1	172	1.8425	46.1
2	92	1.9300	48.3
3	44	2.3182	58.0
4	-	-	-

Option 6 - Conic Sections

	n	mean	percent
Stratum 1	364	2.1805	54.5
2	84	1.2485	31.2
3	37	0.7027	17.6
4	-	-	-

Option 7 - Transformation of Conics

	n	mean	percent
Stratum 1	117	1.7865	44.7
2	25	1.0800	27.0
3	-	-	-
4	-	-	-

*No students in the stratum selected this option.

PROVINCIAL RESULTS

MATHEMATICS ASSESSMENT 1987 - GRADE 12-300

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)

QUESTION PART A	A	B	C	D	E	NR
1	8.2	4.3	10.9	12.4	63.4*	0.8
2	3.7	24.1	69.0*	1.2	2.0	-
3	3.0	4.2	57.0*	11.4	24.0	0.4
4	16.9	41.8*	16.6	12.9	11.4	0.4
5	27.7	35.0*	28.1	4.5	4.5	0.2
6	3.9	2.0	86.5*	3.3	4.2	0.1
7	57.3*	2.2	32.7	6.3	1.4	0.1
8	9.9	8.3	23.0	18.1	39.3*	1.4
9	4.0	7.5	20.3	61.8*	6.1	0.3
10	26.9	8.9	47.4*	10.3	6.1	0.4
11	9.7	30.1	43.8*	8.0	7.0	1.4
12	25.6	12.0	14.8	36.5*	10.8	0.3
13	76.1*	14.0	6.8	1.3	1.5	0.3
14	20.0	16.9	12.2	14.8	34.6*	1.5
15	47.6	11.3	5.3	22.5	13.1*	0.2
16	24.1	11.7	13.1	32.2*	17.1	1.8
17	13.9	41.1*	20.7	10.8	11.3	2.2
18	3.9	50.6*	8.3	10.4	26.8	-
19	18.5	10.5	35.1*	24.6	9.2	2.1
20	34.3*	23.4	18.4	19.2	2.1	2.6
21	34.9*	19.2	25.3	11.0	7.8	1.8

QUESTION	A	B	C	D	E	NR
22	10.8	7.7	70.4*	4.6	5.9	0.6
23	3.9	35.1*	2.9	7.4	50.6	0.1
24	12.9	15.3	14.3	50.2*	6.2	1.1
25	20.5	14.1	32.2*	14.6	18.3	0.3
26	24.0*	11.6	17.4	5.3	41.3	0.4
27	54.3*	13.1	15.8	9.8	5.6	1.4
28	13.2	54.9*	10.3	12.4	6.8	2.4
29	35.8*	14.8	34.1	8.2	6.1	1.0
30	9.0	48.8*	10.8	10.3	19.7	1.4
31	13.0	23.0	15.9	26.8*	15.3	6.0

Individual item data were not produced for the seven option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.

Grade 12 - 301
Core Topics n=542 df=21

	Number of Items	Mean Score	Standard Error of Measurement	Percent
1. Consumer Mathematics	10	6.80	0.0389	68.0
2. Algebra	12	6.42	0.0537	53.5
3. Trigonometry	4	2.05	0.0189	51.3
4. Statistics	4	2.00	0.0250	50.0

Item Numbers Appearing in each Subtest

	CORE TOPICS	ITEM NUMBERS
CI	Consumer Mathematics	1-10
CII	Algebra	11-22
CIII	Trigonometry	23-26
CIV	Statistics	27-30
	OPTION TOPICS	
O.I	Annuities	31-34
O.II	Depreciation	41-44
O.III	Digital Logic	51-54
O.IV	Investments	61-64
O.V	Interpretation of Graphs	71-74
O.VI	Quadratic Equations	81-84
O.VII	Transformations of Conics	91-94
O.VIII	Statistics	101-104

Math 301 - Option Topics
(Each option has 4 items)

Provincial data are not reported for the options because of the low numbers of students selecting any given option in certain strata. Stratum scores should be interpreted with caution as not all sample schools within a stratum chose the same options.

Option 1 - Annuities

	n	mean	percent
Stratum 1	-	-	-
2	20	1.3	33.0
3	-	-	-
4	-	-	-

Option 2 - Depreciation

	n	mean	percent
Stratum 1	-	-	-
2	77	2.0107	50.3
3	-	-	-
4	5	2.2000	55.0

Option 3 - Digital Logic

	n	mean	percent
Stratum 1	-		
2	-	No students chose this option.	
3	-		
4	-		

Option 4 - Investments

	n	mean	percent
Stratum 1	46	1.7125	42.8
2	96	2.4368	60.9
3	-	-	
4	4	1.0000	25.0

Option 5 - Interpretation of Graphs

	n	mean	percent
Stratum 1	118	2.0165	50.4
2	64	2.4994	62.5
3	24	2.6250	65.6
4	19	2.1615	54.0

Option 6 - Quadratic Equations

	n	mean	percent
Stratum 1	171	1.0104	25.3
2	78	1.4248	35.6
3	70	0.8667	21.7
4	16	0.6667	16.7

Option 7 - Permutations & Combinations

	n	mean	percent
Stratum 1	10	1.6000	40.0
2	72	1.5099	37.7
3	40	1.6250	40.6
4	-	-	-

Option 8 - Statistics

	n	mean	percent
Stratum 1	51	1.0980	27.5
2	41	0.4890	12.2
3	6	1.8333	45.8
4	-	-	-

PRELIMINARY REPORT

PROVINCIAL RESULTS

MATHEMATICS ASSESSMENT 1987 - GRADE 12-301

PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION

(* INDICATES CORRECT RESPONSE)

QUESTION PART A	A	B	C	D	E	NR
1	2.3	3.4	3.8	82.0*	7.5	1.0
2	1.4	36.2*	14.0	2.5	45.5	0.4
3	91.4*	1.3	1.7	.2	4.8	0.6
4	1.5	2.2	69.7	.7	25.8*	0.1
5	4.1	90.2*	1.2	1.6	2.6	0.3
6	4.8	65.5*	3.6	25.0	.3	0.8
7	4.2	2.2	84.7*	5.8	2.1	1.0
8	13.5	64.0*	6.4	2.9	12.9	0.3
9	61.4*	14.6	14.2	6.5	2.0	1.3
10	3.6	8.6	78.6*	4.6	3.9	0.7
11	10.5	10.0	5.7	70.2*	3.3	0.3
12	12.1	45.6	33.9*	5.1	2.5	0.8
13	7.0	1.9	75.4*	8.9	6.4	0.4
14	6.5	13.4	2.3	15.5	62.0*	0.3
15	13.0	52.4*	14.0	10.0	10.0	0.6
16	2.1	9.7	6.1	77.0*	4.9	0.2
17	10.6	15.8	16.6	5.0	51.3*	0.7
18	9.5	14.1	50.8*	17.9	6.6	1.1
19	37.0*	5.5	4.2	29.4	23.5	0.4
20	2.3	10.1	80.0*	3.6	3.4	0:6
21	28.9*	21.4	12.4	20.0	16.3	1.0

QUESTION	A	B	C	D	E	NR
22	3.8	53.8	12.6	23.3*	5.9	0.6
23	12.8	2.6	9.7	64.1*	10.3	0.5
24	4.3	17.8	13.0	16.9	46.6*	1.4
25	2.7	6.9	14.1	73.3*	1.7	1.3
26	15.6	25.3	27.6	21.1*	8.9	1.5
27	3.4	5.0	76.8*	3.2	11.0	0.6
28	16.4	55.5*	7.4	16.2	4.1	0.4
29	50.7*	10.3	8.2	12.9	16.1	1.8
30	8.7	9.1	16.6*	28.8	34.9	1.9

Individual item data were not produced for the eight option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.